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E71 Introduction Workbook

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Introduction

Model: E71

Production: From Start of Production

OBJECTIVES

After completion of this module you will be able to:

- Compare the E70 X5 with the E71 X6
- Describe the new technology used on the E71 X6
- Identify the features of the E71 X6

The All-New X6

“Dynamic Elegance”, “The first of its kind”, are some of the phrases and accolades that BMW and the media have employed when speaking about the new BMW X6. Just two days after its worldwide debut, the BMW X6 Sports Activity Coupe was named “Best Production Truck” at the Eyes On Design Awards at the North American International Auto Show (NAIAS).

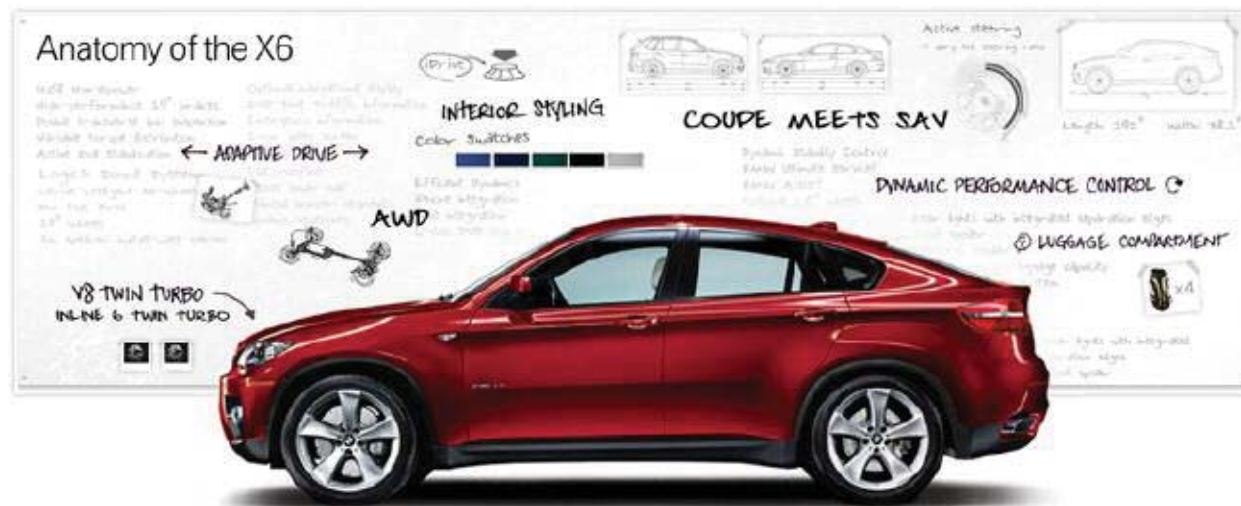
The X6 is a totally new concept due to arrive in the US in March of 2008. BMW has combined the practicality and convenience of the Sport Activity Vehicle (SAV) with the styling and features of a sport coupe. This new concept is being referred to as a (SAC) or Sport Activity Coupe.

The stylish lines of the X6 are combined with a sleek and sporty wide stance which is signature of all BMW coupes. The X6 sloping roofline continues all the way to the newly designed tailgate. The passenger compartment accommodates four occupants in a higher sitting position, while offering all the same options and amenities available on current E70 Vehicles. With the rear split seats lowered, the X6 delivers the largest cargo room in its class.

Built on the E70 platform, the X6 also employs xDrive (BMW all-wheel-drive technology with electronic control for variable distribution of drive power between the front and rear axles), only to be taken to another level with the use of Dynamic Performance Control (DPC).

The typical E70 xDrive system is now coupled with a totally new QMVH differential and a new system referred to as Integrated Chassis Management (ICM) system. This new system allows the distribution of the drive torque from front to rear as well as from left to right at the rear axle. xDrive with QMVH continually adjusts to any driving condition and performs well in all situations.

The X6 will be available in two models, differentiated mainly by their power plant. The xDrive35i will sport the already familiar N54 engine with its 3.0 liter twin turbo, direct injection, 300 hp and 300lb-ft torque six cylinder. The xDrive50i gets the N63, a new 4.4 liter, 400 hp, 450 lb-ft torque V8 engine with direct injection and twin turbochargers (neatly tucked into the engine valley).



Body

The E71 will be launched in early 2008 and will be available in the following models:

- X6 xDrive50i with N63B4400 engine
- X6 xDrive35i with N54B3000 engine



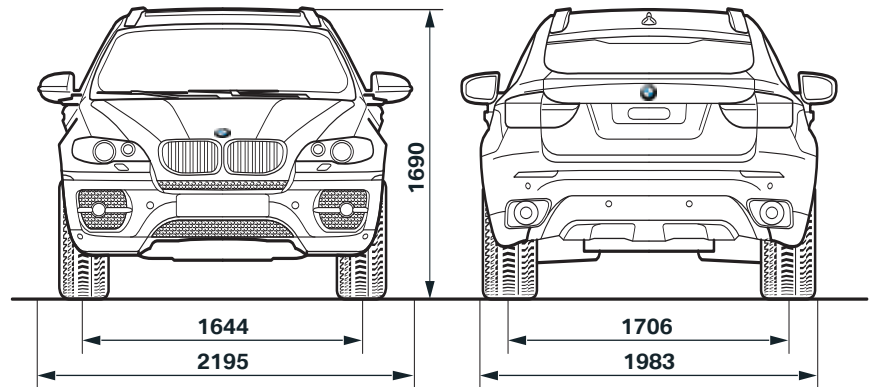
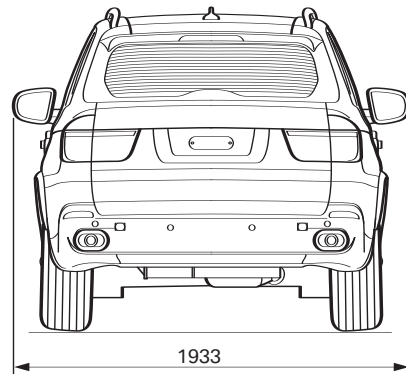
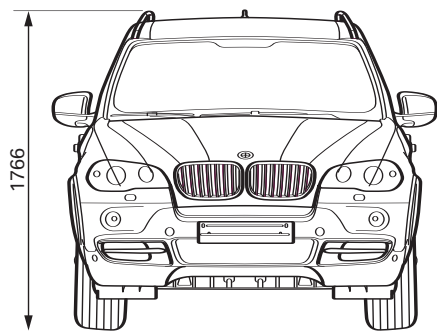
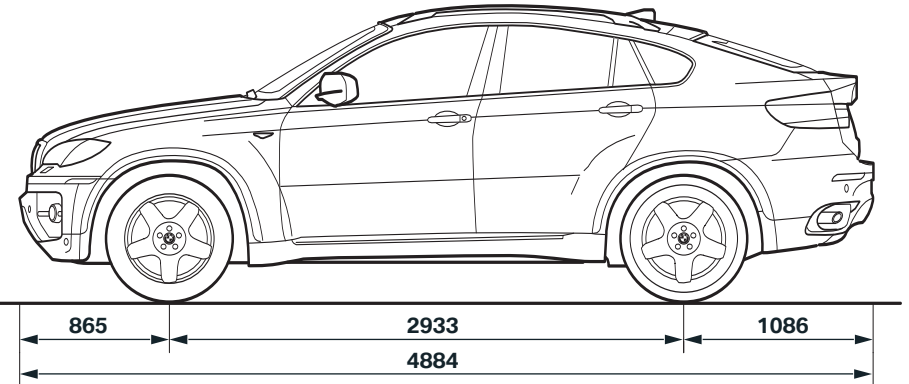
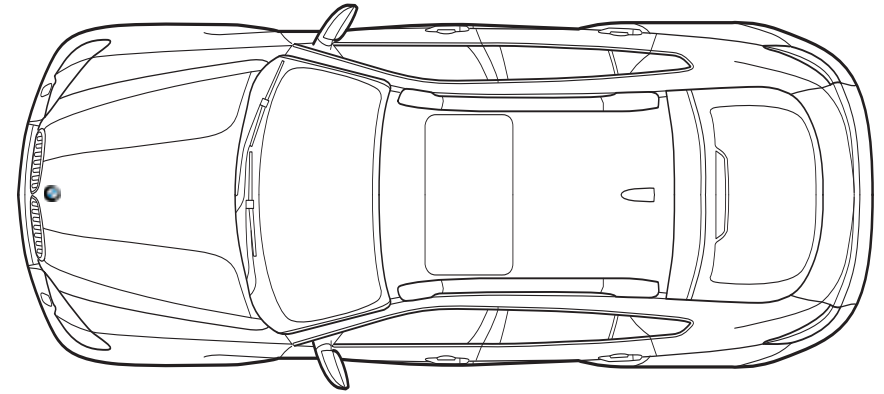
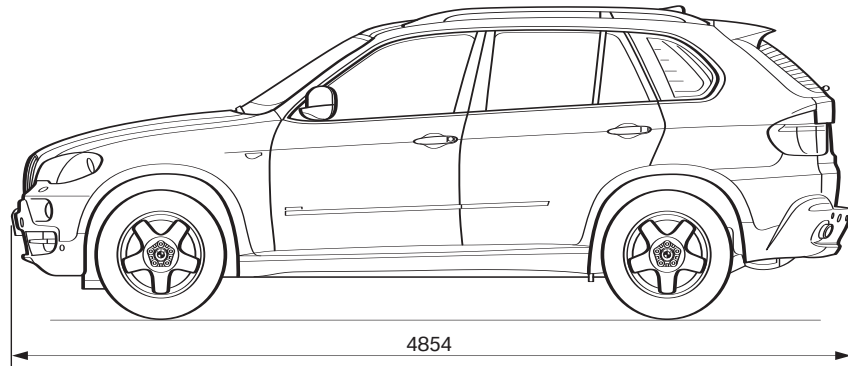
To further reinforce the sports-oriented character of the E71, compared to the E70, the conventional chassis has been set lower by 10 mm.

The ride height has remained the same as on the E70 for the chassis and suspension system with adaptive drive.

Compared to the E70, the dimensions and weight of the E71 are as follows:

Specification	E71	E70
Unladen weight (kg)	2,145	2,125
Length (mm)	4,884	4,854
Width (mm)	2,195	2,197
Height (mm)	1,690	1,766
Wheelbase (mm)	2,933	2,933
Track width, front (mm)	1,644	1,644
Track width, rear (mm)	1,706	1,650

Technical Comparison (E70 vs E71)



E70 X5 Body Dimensions

E71 X6 Body Dimensions

Bodyshell Construction

- In the E71, demanding functional requirements have been achieved by the consistent implementation of innovative light-weight construction while adopting many components from the E70 sub-frame.
- The E71 features hot-formed BTR materials in tailor rolled blanks (TRB) as well as micro-alloyed dual-phase steels.
- Torsional rigidity is comparable to the E70.

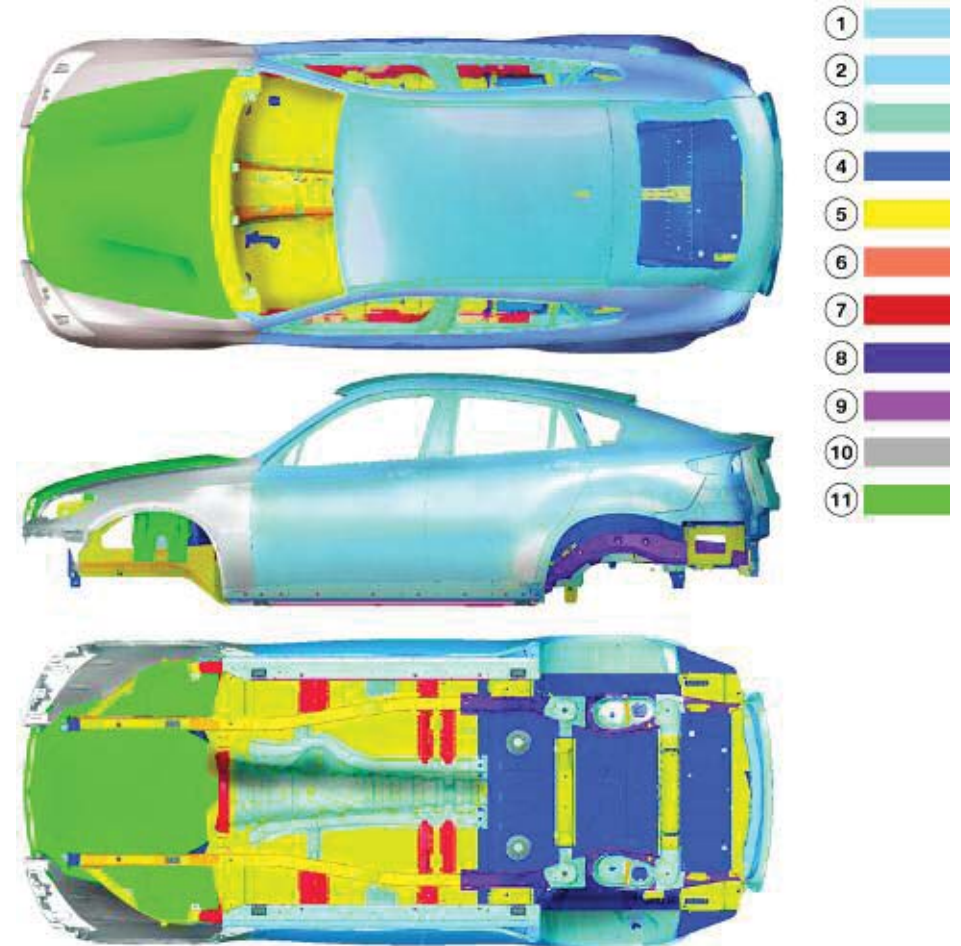
The design layout of the body structure was primarily based on optimum interaction of passive safety measures for the purpose of achieving maximum safety for all vehicle occupants.

A large number of body reinforcements were used in the safety-relevant areas of the front end, B-pillar and rear end while using new steel grades to provide a greater load bearing capacity compared to conventional steel. As a result, impact deformation is kept as low as possible while interacting with the restraint systems to ensure maximum safety for all occupants. Impact energy that occurs during a collision is absorbed by the structure and correspondingly directed along load paths.

The structure of the E71 was designed to conform to the US Lateral Impact New Car Assessment Program (LINCAP) at 64 km/h/40mph with crabbed barrier, to US Insurance Institute for Highway Safety (IIHS) new side impact test at 50 km/h/31mph at 90° as well as to US high speed rear end impact 80 km/h/50mph with 70% offset.

With the aim of providing the highest possible level of occupant protection in connection with the safety passenger compartment, all conceivable situations, going beyond legal requirements, were considered in the simulations.

The body structure remains intact at an impact of up to 15 km/h (lateral 40% offset at front and rear) at an impact angle of 10°.



Index	Explanation	Index	Explanation
1	Other steels	7	CR420X, CR950DL
2	DC04 - DX54D, DX56D	8	HD680C
3	HC180BD - HC180YD	9	22MnB5 (BTR165)
4	HC260BD, HC240LAD	10	Plastic
5	HC300BD	11	AlMg3Mn - AlSi10MgMn, AlMg04, 5Mn04
6	HC380LAD		

Passive Safety

A complex, perfectly coordinated system, consisting of various safety components ensures the greatest possible passenger protection in the event of an accident occurring while reinforcing the concept of "The Ultimate Driving Machine". This system consists of the seat belt, airbag and steering assembly maximizes passenger safety.

The integrated safety electronics has the important task of triggering the right airbag at the right safety level and right time corresponding to the type and severity of collision. The intelligent system does not deploy any airbags that are not required, thus ensuring that they are still available to protect the vehicle occupants in the event of secondary impacts. This system achieves the US Top Safety Picks in the IIHS crash test.

Structure

The greatest possible degree of safety at the lowest possible weight was achieved through intensive co-operation between development engineers and safety experts as part of the development of the E71 body:

- Optimum design layout and utilization of deformation zones for generating intelligent and coordinated vehicle characteristics.
- Extremely rigid passenger compartments.
- High-strength, large volume carrier structures with specific use of high and super high strength steel grades in the front section, roof and side frame as well as in the rear section.
- The implementation of tried-and-tested design elements in frontal impacts with complete or minimum offset for effective transmission and dissipation of forces.

- Minimizing of deformation depth and intrusion speeds during side impacts through reinforced side structures in the B-pillar and sill/rockers, high-strength door reinforcement, sturdy seat cross member and a cross beam in the underbody assembly.
- Even in the event of a severe impact, the passenger compartment effectively safeguards the occupants thanks to the heavily reinforced pillars and roof members.

The energy-absorption characteristics are achieved by maintaining the passenger compartment structure and the successful adaptation of restraint systems.

It was possible to significantly improve the rigidity of the body by using a closed torsion ring around the D-pillar and by optimum node design layout. Another feature used to increase the torsional strength is the load-sharing, wedged tailgate. By applying tension to the hatch between the D-pillars, the hatch shell, with its profiles, increases the rigidity.

E71 Torsion Ring



Pedestrian Protection

This system was adopted from the E70:

- The aluminum hood
- The hood hinges have a disengaging mechanism in the direction of impact
- The brackets for the hood latches collapse
- The plastic side panel module

The bodyshell structure has been lowered and the resulting space filled in with a plastic carrier structure (module carrier) with a plastic fender. This separates the "soft" requirements of design and pedestrian protection from the "hard" requirements of rigidity, stability, high and low-speed crash performance.

The front lower wheel arch carrier support creates a space which is filled with a plastic module carrier.

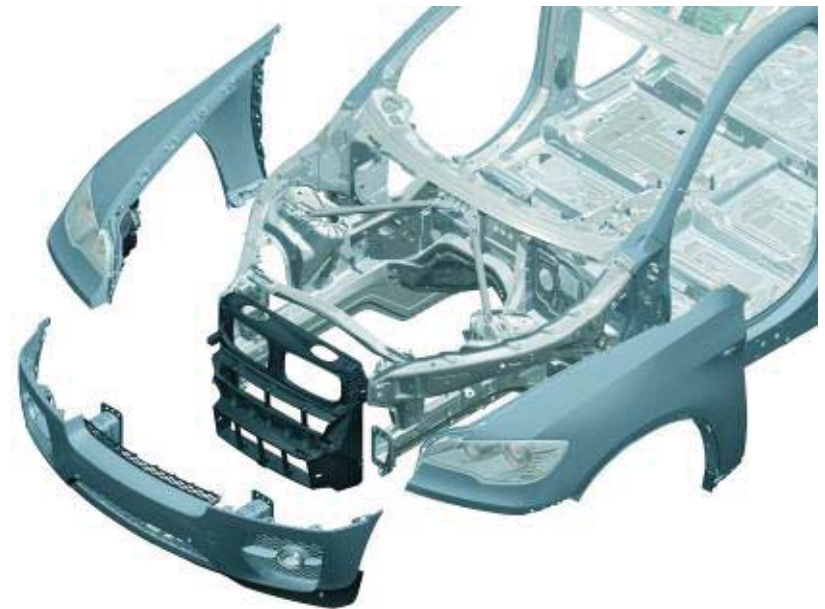


E71 Side Panel Module

Front End Design

The fenders are made from a plastic, of the same material as the bumper panels. This makes it possible to use the same painting process (painting temperature should be 85°C/185°F) for both components.

In simulated pedestrian protection tests, a test object (3.5 kg/7.7 lb) is shot against the side panel at a speed of 35-40 km/h or 25mph.



E71 Front Section Components

In most cases, the deformation proved to be reversible (no splintering and no breakage of component, including the paint work). As a passive system, the module carrier of the side panel module effectively contributes to complying with pedestrian protection requirements. With its ribbed structure, the module carrier essentially acts as a spring element.

Interior

Accents and Features

For the purpose of differentiating the top engine models, the BMW X6 exhibits the following design features.

- Badges on front fenders differentiate engine models
 - xDrive35i
 - xDrive50i
- Sporty coupe appearance
- Chrome trim accentuates windows
- The already expressive kidney is further accentuated and the sports-orientated character of the vehicle is emphasized.
- An E60 style sunroof is used with Panorama glass sunroof option not available for E71.

Continuous chrome strip in area of 'Hofmeister' kink, no joint as on other models.

Dashboard

The leather-grain surface material of the dashboard is made from an in mould coating (IMC) slush skin with the following properties:

Maximum performance over the entire service life of the vehicle, light resistant, provides protection against scratching and soiling, complies with technical and legal requirements, excellent appearance as well as touch and feel properties.

The leather-coated dashboard option provides optimum appearance and feel. Special non-woven upholstery padding under the leather makes it feel soft and flexible. The leather therefore has ample give when touched. The scent of real leather conveys an air of exclusivity in the vehicle interior.

The seams additionally contribute to the high-grade visual appearance of the dashboard and door shoulder.

Door Trim

- 2-part decor strip for high-quality appearance.
- Leather trim pull handle (available in Nevada leather, Alcantara and Saddle exclusive leather), basic: soft paint; Handle bracket in 2-component technology.
- Ambient lighting in the door handle and in the door pocket (option).
- Recessed handle for driver's door.

The new recessed handle in the driver's door improved ergonomics. While new ambient lighting (option) conveys a better impression of space at night.



**Front door trim,
front passenger side**



Rear door trim

Front Seats

The following seat variants are offered for the E70:

- Fully electric basic seat
- Multifunction seat
- Sports seat

In addition to the functions of the fully electrically operated basic seat, the multifunction seat also has:

- Electric backrest-head adjustment
- Pneumatic lumbar support depth and height adjustment
- Electric head restraint height adjustment
- Luxury head restraint with manual lateral adjustment ("rest head restraint")
- Electric seat back width adjustment
- Electric depth adjustment of the seat
- Memory functions for driver and front passenger



Possible options (driver and front passenger):

- Four-circuit seat heating
- Active seat
- Active seat ventilation including seat heating

Active Seat Ventilation

The improved cushion and cover design and active ventilation of the seats increases the climate and physiological well-being of the passengers.

The system is operated by means of a button on the climate control panel. A blue LCD indicates that the system is active. The setting (3-stage) is shown in the control display.

This option is only available in conjunction with the electrically adjustable front luxury option and the seat heating option for driver and front passenger.

Active seat ventilation is split into the following components:

- Perforated cover in Nevada leather
- Seat heating
- Interlay knitted fabric for optimum air distribution
- Nine axial-flow fans (four in the backrest, five in the seat cushion)

Note: Crash sensitive head restraints are standard equipment.



Rear Seats

The vehicle offers ample knee room in the rear while the range of options makes it possible to individualize. There are two individual sports style seats in the rear, demonstrating the E71's coupe character while creating an exclusive atmosphere. Additional storage space is provided on either side between the rear seats and door trim panel.

Two large drink holders and a storage compartment or alternatively an ashtray and cigarette lighter are integrated in the rear console located between the two individual seats. This unit is closed off by two roller covers, concealing a large, open and divided storage compartment.



Note: The ISOFIX system is accessed through a slit in the seat cover.

Individual Rear Seats

The seats are designed as full foam folding split seats with separate backrest and seat cushion and a torso angle of 26°. The split ratio is 60/40. The backrest is unlocked by means of a handle on the backrest. The integrated head restraints and the individual seats with molded side sections underscore the high-performance coupe character of the rear seat system. The special design layout of the headliner ensures optimum headroom without having to forego a folding center armrest and a ski bag (option).

Rear seat heating (three-stage switch, heating output as on E70); is only in conjunction with front seat heating.

Seat Belt Height Adjustment

In terms of passive safety, due to the geometry of the area surrounding the seats, there is no need for a seat belt height adjustment feature. In the E71, the seat belt system has been ergonomically tailored to the rear passengers while taking the various physical sizes into account. This system complies with stringent passenger safety requirements and corresponding legal stipulations.



Glove Compartment

The E71 glove compartment was inspired by the E70 design. It locks automatically when the vehicle is locked. The volume of the glove box is bigger, as the airbag has been moved closer to the windshield. The new position makes it easier to look into and access stored items.

Both lids are opened by means of a button on the left, next to the glove compartment. This is located under the center grill, integrated into the right side end of the lower accent strip. The lids are coupled with each other; in a way that they automatically move together upwards or downward at the push of a button.

A 6-disc DVD multimedia changer is offered as an option, with CCC cars only. It is located in the glove box and will also be available on the E70. This option allows video media to be played on the front CID providing the vehicle speed is 0 mph.



Glove compartment with optional multimedia changer

Center Storage Compartments

The console storage compartment is located on the center console, the two lids can be opened separately at the push of a button. The buttons are located on the front of the console, each directly to the right or left beneath the lids. The lids may be operated individually. They open automatically with a spring and are closed manually.



Drinks holders and extra storage tray, are located in the front section of the center console, where the compartment tray is covered by sliding roller doors. These meet in the middle and can be opened to the front or back with two small handles. In the front area, there is a storage tray or, optionally, an ashtray with a cigarette lighter. In the rear section there are two large drinks holders.

Knee Pads

Knee pads made from high-quality glass fiber reinforced plastic, characterized by outstanding stability and lightweight construction. The knee pads are coated with leather as standard. The knee pads can be coated with all types of leather depending on the selected leather option. The Alcantara leather combination is considered the exclusive leather option.



Luggage Compartment

- A large luggage compartment volume at 1540 liters compared to large coupe and SUVs.
- Delivers ample functionality.
- Extensive additional storage options.
- Folding luggage compartment cover can be stowed away under luggage compartment floor.
- Stainless steel loading step/sill.
- Storage package with two lashing rails (option).

The design layout and size of the luggage compartment are noteworthy when compared to vehicle of this class.

Due to the run-flat tires standard on this vehicle a spare tire is no longer required. Though a space saver tire is standard equipment in the US.

The luggage compartment floor is opened with the help of gas-pressurized prop piston. The optional storage package includes useful items such as two lashing rails with four adjustable lashing eyes, stowage nets, bag hooks, a light for the storage compartment and a 12 Volt connection in the center console.

The luggage compartment floor is lockable as standard. The luggage compartment cover is easy to remove and install and coated with a high quality textile material. Due to its Z-folding design, the cover can be folded and stored under the luggage compartment floor provided the space-saver wheel option was not ordered.

An fastening system is optionally offered, which is available only together with the storage package. With this option, the luggage compartment can be divided allowing smaller items of luggage to be secured.



The stainless steel loading step/sill gives the vehicle an individual and high quality appearance.



Tailgate

There is two different tailgates options offered on the E71 X6:

- Manual Tailgate with dual height adjustment
- Automatic Tailgate (HKL)

Manual Tailgate

The system operates with the use of two hydraulic shocks that provide the lifting of the tailgate. To set the maximum tailgate opening height, these hydraulic shocks can be manually adjusted to 2 separate positions. The adjustment is made by rotating the hydraulic shock/covers on the right and left lifting cylinders, which are appropriately, marked 1 and 2.

When set to the #1 position, the tailgate opens up to its low setting. When the #2 position is selected, the tailgate is raised to its maximum setting. To fully open the tailgate when the adjustment is in position (1), the tailgate must be first lowered approximately 12" and then raised all the way up, before position #2 is selected.

Manual Tailgate adjustment on the hydraulic lifting shocks



Note: The adjustment can only be performed when the tailgate is in the fully “open up” position.

Position #1 corresponds to the lowest tailgate height setting.
(Lowest Setting)



Position #2 corresponds to the highest tailgate height setting.
(Highest Setting)



Automatic Tailgate (HKL)

In terms of its functionality, the automatic tailgate operation is identical to that of the E70 X5 HKL. It differs only by minor changes made to the mechanical and electrical systems. The automatic tailgate operating system has been adapted to the body of the X6 and only the changes/modifications are outlined.

The tailgate of the E71 X6 is a one-piece component.

Automatic opening of the tailgate may be done by remote control or push button. Closing the tailgate is only possible with the use of the push button. The push button on the inside of the tailgate no longer connects to the junction box but rather directly to the HKL module.

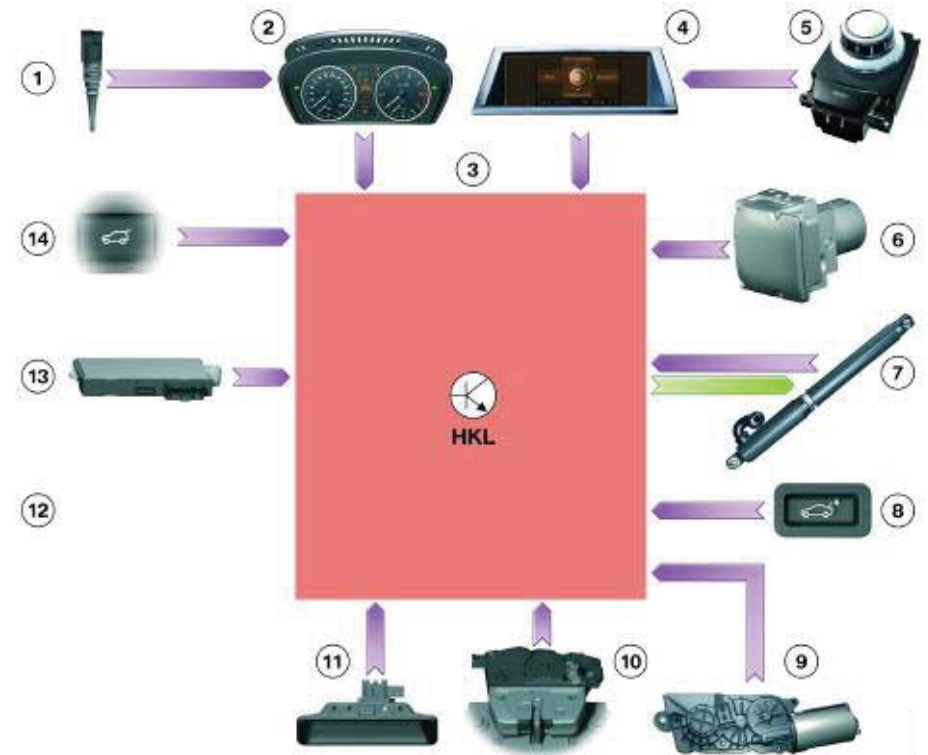
An anti-trap system is provided and integrated into the screw drive units. The HKL monitors position and current of the screw drive units.

Since there is no lower tailgate, there is no need for the lower tailgate contact. The fact that no signal is sent is ignored by the control unit (JB).

Automatic Tailgate Operation

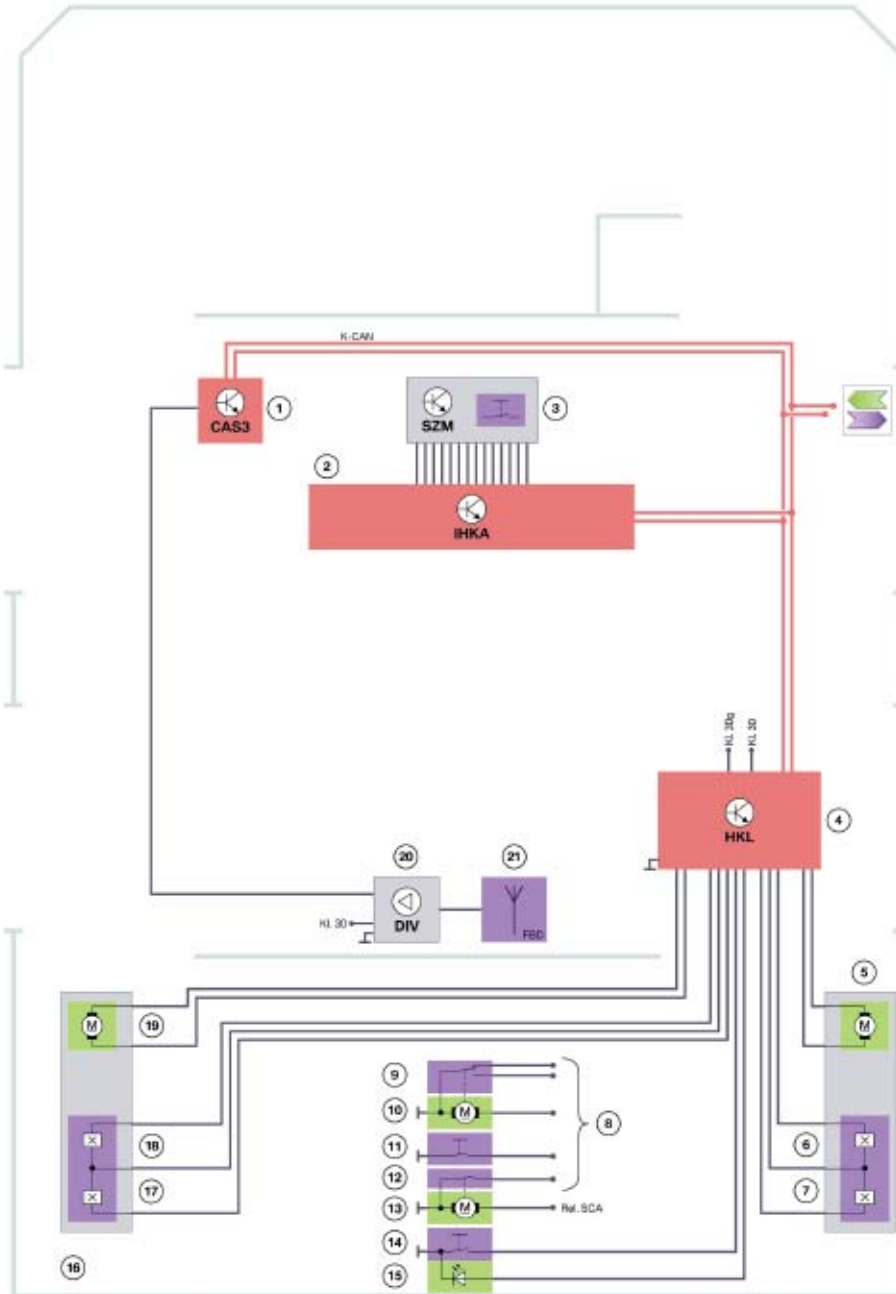
The tailgate lift (3) controls and monitors the opening or closing of the tailgate. This can be triggered by the tailgate push buttons (8, 11 and 14). The controller (5) can be used to adjust the maximum opening angle for the tailgate on Central Information Display (4).

The signals from outside temperature sensor (1) and the vehicle speed (6) are evaluated in the decision as to whether the tailgate may be opened or closed in response to pushing the button.



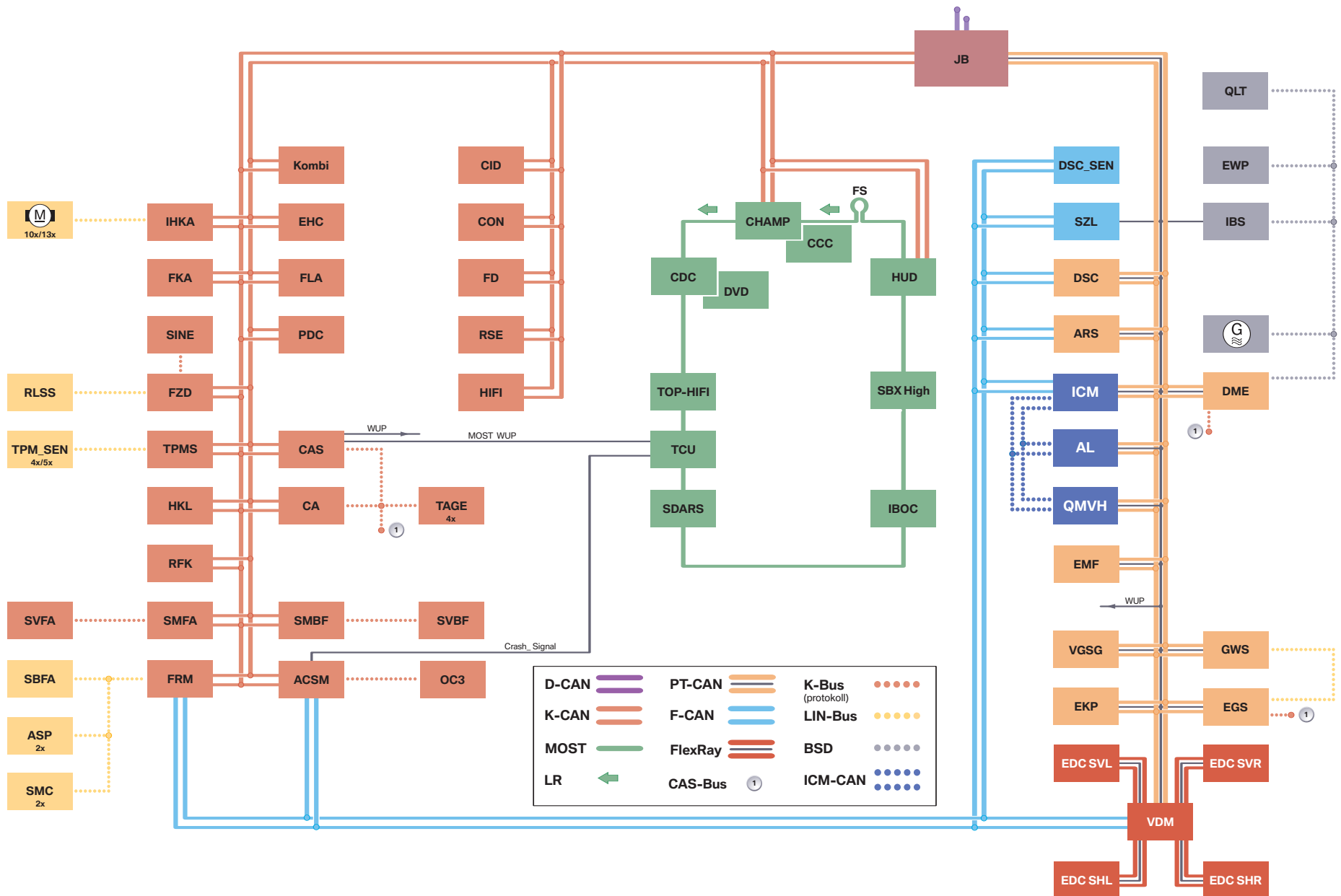
Index	Explanation	Index	Explanation
1	Outside temperature sensor	8	Interior tailgate push button
2	Instrument cluster	9	Drive unit for automatic soft-close function
3	Automatic tailgate operation control unit	10	Tailgate lock
4	Central information display	11	Exterior tailgate push button
5	Controller	12	Not applicable
6	Dynamic stability control	13	Car Access System 3
7	Tailgate screw drive	14	Interior tailgate push button

E71 Automatic Tailgate Operation System Circuit Diagram



Index	Explanation	Index	Explanation
1	Car Access System 3 (CAS3)	14	Interior tailgate push button
2	Integrated automatic heating and air-conditioning system (IHKA)	15	Interior tailgate push button illumination
3	Tailgate push button in the center console switch cluster (SZM)	16	Not applicable
4	Tailgate lift (HKL)	17	Hall sensor, left
5	Spindle drive motor, right	18	Hall sensor, left
6	Hall sensor, right	19	Spindle drive motor, left
7	Hall sensor, right	20	Remote control receiver in diversity module
8	Connections to the junction-box (ECU)	21	Remote control aerial in the rear window
9	Rear hatch contact	K-CAN	Body CAN
10	Upper tailgate lock motor	KI.30	Terminal 30
11	Exterior tailgate push button	KI.30g	Terminal 30 switched
12	Contact for drive of automatic soft-close function	Rel.S CA	Connection to the automatic soft-close relay
13	Automatic soft-close for tailgate		

Bus System Overview





Workshop Exercise - Vehicle Walk Around

Using this training manual, inspect the overall vehicle exterior and answer the questions below:

Fill in the chart below regarding the external body materials.

Body Component	Material
Hood	
Fenders	
Doors	

Fill in the blank below with the correct answer regarding the overall dimensions on the E71:

The overall length the E71 is _____ mm, _____ than the E70.

The unladen weight of the E71 is _____ kg, _____ than the E70.

The wheelbase of the E71 is _____ mm, _____ than the E70.

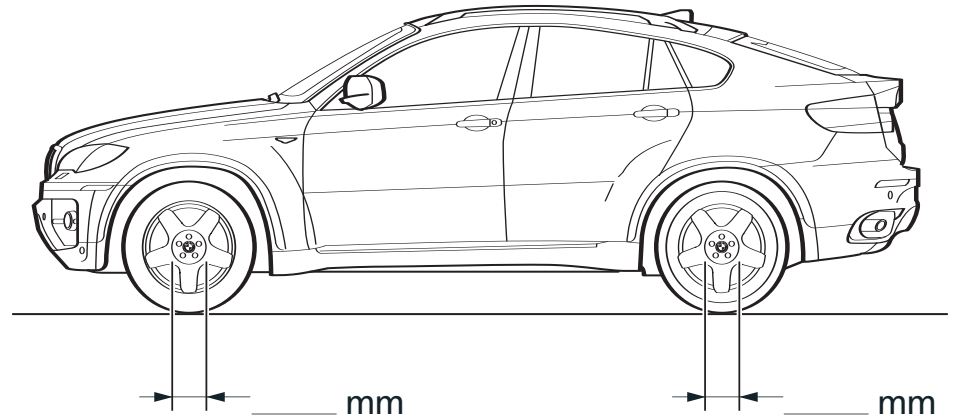
The overall height of the E71 is _____ mm, _____ than the E70.

Observe the wheels and tires on the E71.

Are run-flat tires standard or optional on the E71?

What's the obvious difference between the front and rear wheels?

Measure the front and rear hubs and record your findings below.



What is the purpose of this feature on the E71?

What precaution must be taken while mounting the available space saver spare tire in these vehicles?

Will E70 wheels fit on an E71 vehicle properly?



Workshop Exercise - Vehicle Walk Around

Open the tailgate and note its operation.

In comparison to the E70, how does the E71 tailgate differ?

E70 Deck Lid



Locate and note the position/operation of the emergency tailgate release.

Where is the emergency tailgate release located?

What tool, if any, is needed to gain access and operate the emergency tailgate release?

Take note of the tailgate height when fully opened.

Is the maximum opening height of the E71 HKL tailgate adjustable?

How is the maximum opening height of the E71 HKL tailgate adjusted?

E71 Deck Lid



Is there an anti-trap system for the HKL tailgate operation?

Where is the anti-trap device located?



Workshop Exercise - Vehicle Walk Around

Look over the vehicle interior of the E71.



What is the passenger capacity of the E71?

Locate the vehicle tool kit and note contents.

In the tool kit, there is a red “hammer like” tool, what are the two uses for this tool?

1.

2.

How do these procedures differ from the E70?

Find the following components and note locations:

Component	Location
Battery	
DSC control Module	
Spare Tire	
SDARS	
HiFi Amplifier	
TCU	
Fuel Pump Module (EKP)	
ICM Module	
Rear Power Distribution Box	
QMVH Module	
Vertical Dynamics Module (VDM)	
Cooling pump for turbos (N63)	
Cooling pump for intercoolers (N63)	



Workshop Exercise - Vehicle Walk Around

Examine underhood components and note the following items:

- Engine Oil Fill
- Dipstick (N54 and N63) Oil Level Sensor(N54 and N63)
- Washer Fluid Fill
- Power Steering Fill
- Brake Fluid Fill (Master Cylinder)
- E-Box Access
- A/C High and Low Pressure Ports
- Microfilter Access
- A/C Ambient (Outside) Temp Sensor
- Air Filter Replacement
- Fender Adjustment Points
- Headlight Bulb Access
- DME Control Module Location
- Battery Junction Locations
- Coolant Reservoir Fill (N54 and N63)
- Coolant Reservoir Fill for intercoolers on N63



Examine the N63 engine bay and list the components that need to be removed in order to gain access and replace the air filters.



Workshop Exercise - E71 X6 Cooling Module

Remove the bumper cover, cooler module brace struts, plastic grill frame and top radiator cover.

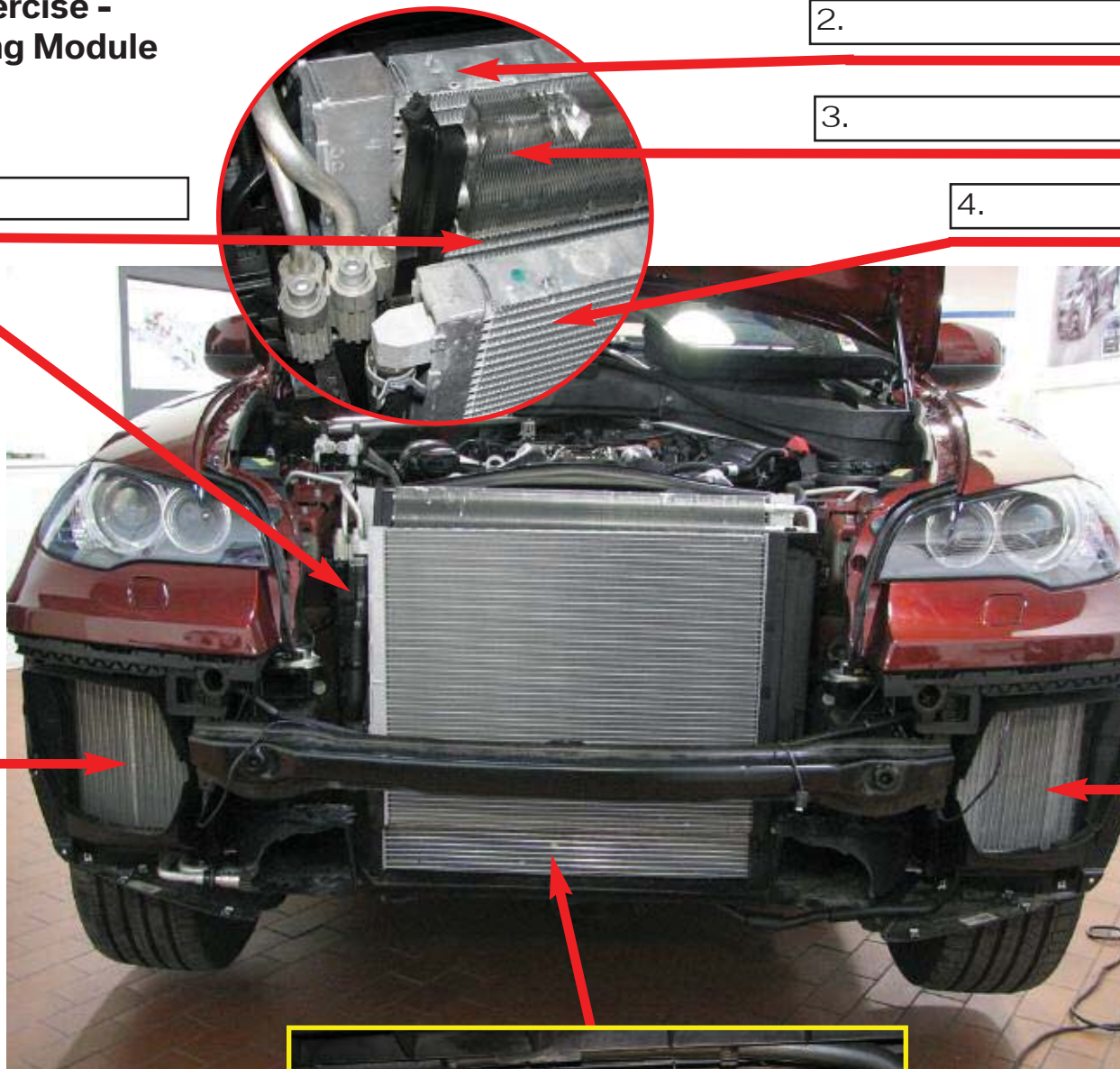
Examine the components of the E71 Cooling module and note their location.

Label each cooler/radiator using the graphics and arrows shown on the next page.





Workshop Exercise - E71 X6 Cooling Module



1.

2.

3.

4.

7.

5.



6.



Workshop Exercise - Walk Around Quiz

1) How is the rear track increased on the E71?

Check the best possible answer.

- With the use of the QMVH system
- With the use of the rear rim off-set
- With the use of wider rear tires
- With the use of rear hub spacers

2) How many motors are used in the HKL system?

Check the best possible answer.

- Two
- Three
- Four

3) What signal typically going to the JBE on (early) E70 is no longer used on late E70 and E71 HKL?

Check the best possible answer.

- Anti-trap signal
- Tailgate open signal
- Tailgate closed signal
- Lower tailgate contact signal

4) Study the E71 Bus System Overview and list the 3 major changes below, compared to the E70 Bus System?

1.

2.

3.

5) What is the tool in the illustration used for in the E71?

Check the best possible answer.

- Emergency open for the tailgate
- Emergency Brake and shifter release
- Emergency Brake release only
- This tool is not used in E71



6) Which statement is **true** about the 6 disc multimedia changer?

Check the best possible answer.

- It can now play DVD/videos on the front CID.
- It now can to play up to 6 DVDs on the rear display.
- The driver can now view a video in the front CID while driving.
- It now can play DVD/videos on the front CID on Non CCC cars.

7) A Panorama Glass roof is available as an option for the E71.

Check the best possible answer.

- TRUE
- FALSE

Walk Around Summary

After the vehicle walk around and overview of topics in the section. Check and make sure you can answer the following questions:

- What are the basic dimensional on the E71?
- What are the materials used on the hood and fenders etc.?
- Do you understand the E71 HKL tailgate operation?
- What are the components/systems involved in the “Pedestrian Protection System”?
- Do you understand the difference between the front and rear wheels on the E71?
- Do you understand the E71 seat options, functions and configuration?
- Do you understand the different models offered of the E71?
- How is the E71 EMF released in the event of an emergency?
- Can you locate the vehicles fuses (front and rear)?
- What is new about the 6 disk changer?
- How is the JB accessed?
- Can you identify and locate all of the changes to the Bus System?
- How are the front headlight bulbs accessed?
- Can you identify and locate the individual coolers that make up the E71 cooling module?